



Vertical distribution of organic aerosols during the 2015 China Victory Day parade in Beijing: Insights from diacids, oxoacids and α -dicarbonyls

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Vertical profiles of dicarboxylic acids, oxoacids, α -dicarbonyls, and other organic tracer compounds in fine aerosol (PM_{2.5}) were measured from the ground surface (8 m) to 260 m at a 325-meter meteorological tower in Beijing during the 2015 China Victory Day parade. Results showed that the concentrations of oxalic acid (C₂), the predominant diacid, were more abundant at 120 m (210 ± 154 ng m⁻³) and 260 m (220 ± 140 ng m⁻³) than those at 8 m (160 ± 90.0 ng m⁻³). Mass concentrations of phthalic acid (Ph) decreased with the increase of sampling heights, which illustrated that vehicular exhausts was an important contributor. Positive correlations were noteworthy for C₂/total diacids with mass ratios of C₂ to main oxoacids (Pyr, ω C₂) and α -dicarbonyls (Gly, MeGly) in polluted days, especially at the ground level. In clean days, the ratios of carbon content in oxalic acid to water soluble organic carbon (C₂-C/WSOC) showed larger values at 120 m and 260 m than those at 8 m. While in haze days, the C₂-C/WSOC ratios reached a peak at the ground level and decreased with height. These phenomena indicated the enhanced contribution of aqueous-phase oxidation to oxalic acid in polluted days when relative humidity was high. Combined with the influences of meteorological conditions, our results illustrated that restrictions on anthropogenic activities largely reduced the dicarboxylic acids (10% – 69%). This study demonstrates that the organic acids at the ground level are largely associated with local traffic emissions, while the long-range atmospheric transport of pollutants from surrounding areas contributed more to diacids and related compounds in the low troposphere over Beijing.